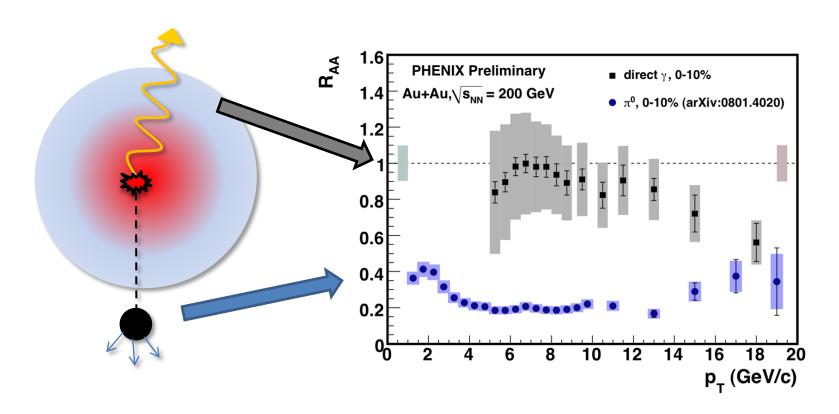
## γ+Jet @ with the PH\*ENIX Detector

Matthew Nguyen
RHIC/AGS User's Meeting
June 5<sup>th</sup>, 2009



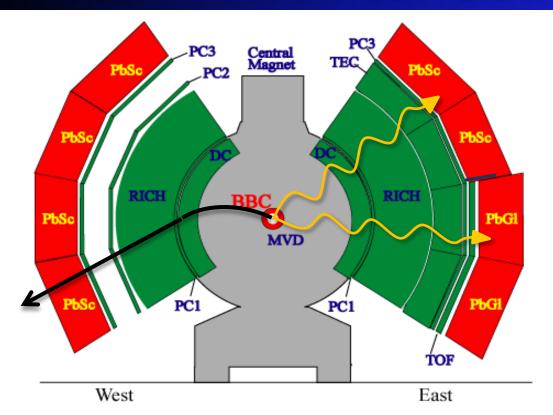


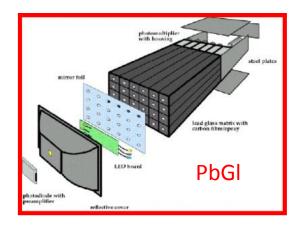
#### Parton Energy Loss in a QGP



Jets are quenched by the medium but  $\gamma$ 's go right though it  $\gamma$ 's can be used to tag absorbed jet and determine their initial momentum

#### **Photon-Hadron Correlations in PHENIX**

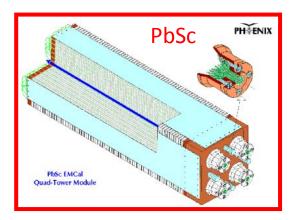




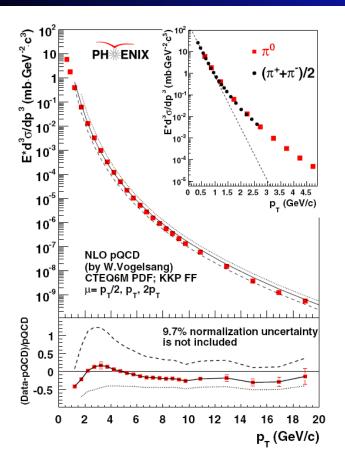
**Electromagnetic Calorimeters** 

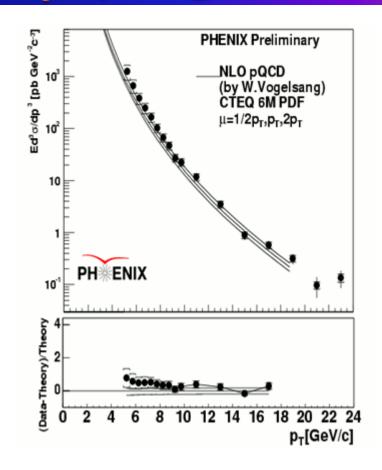


**Charged Particle Tracking: Drift and Pad Chambers** 



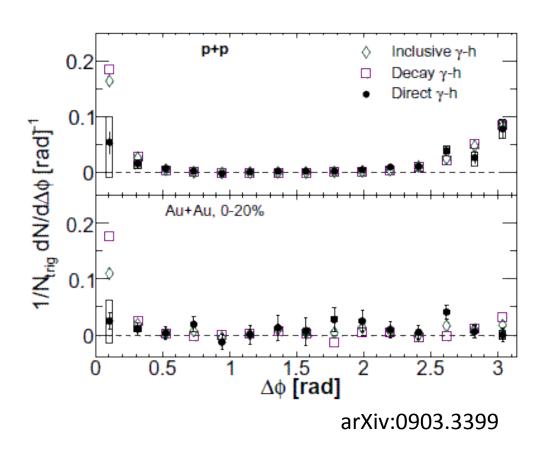
#### The Baseline: NLO pQCD @ RHIC





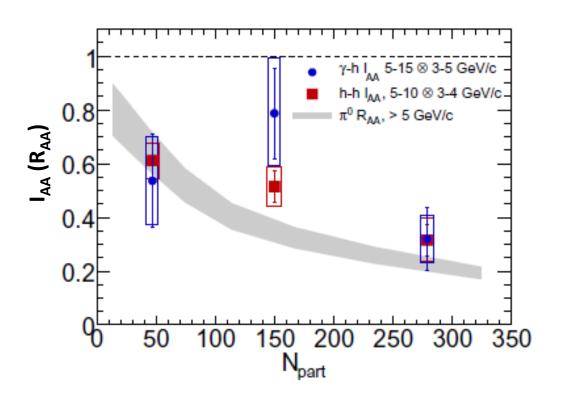
Baseline for quantifying nuclear effects RHIC contribution to HEP (direct  $\gamma$  phenomenology, FF's, ...) Spin physics!

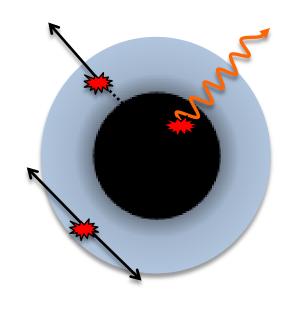
#### Jet Correlations w/ Direct γ's



Large background from decay photon correlations subtracted Small near-side as expected for direct photons Away-side suppression observed in direct γ+jet channel

#### **Quantifying Energy loss**





The strength of the suppression indicates a very dense core

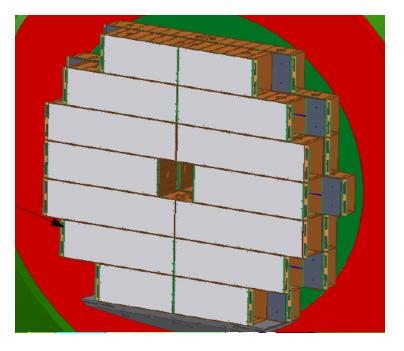
Observed suppression comparable for several observables

With better statistics we expect sensitivity to the different average path-length sampled by different observeables

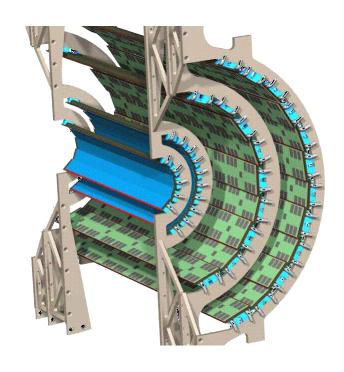
→ density profile of the medium

### The Upgrade Program

#### **FOCAL: Forward Calorimetry**



**VTX: Silicon Vertex Tracker** 



**FOCAL:** Photons and  $\pi^{0}$ 's in 1 <  $\eta$  < 3

VTX: Charged jets at mid-rapidity ( $\eta < 1.2$ )

Increased coverage for  $\gamma$ -h and  $\gamma$ +jet

Determination of the gluon distribution in nuclei using direct  $\gamma$ 's Siver's effect in polarized p+p using  $\gamma$ +jet

# Thank you to the Brookhaven Science Associates and to the organizers of the Users' Meeting